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EXAMINER
UHLIR, NIKOLAS J

ART UNIT	PAPER NUMBER
1773	16

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Please find below and/or attached an Office communication concerning this application or proceeding.

AS-16

Office Action Summary	Application No.	Applicant(s)	
	09/646,198	MATSUI ET AL.	
	Examiner	Art Unit	
	Nikolas J. Uhlir	1773	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 13-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. This office action is in response to the request for continued examination (RCE) dated 8/18/03. The examiner has considered the applicant's amendment/arguments and has found the applicants amendment to claim 1 to require an auxiliary pressurizing step from a pressurizing pin on the molten metal in addition to the casting pressure to be persuasive in overcoming the applied prior art. Accordingly, all of the prior applied rejections are hereby withdrawn. However, the case is not in condition for allowance in lieu of the new grounds of rejection presented below.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-7, and 9, 11 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujino (JP08-197222) in view of Sakoda et al. (EP0730040), further in view of Kaumle et al. (US6068890).

4. For the purpose of this examination, the examiner has relied upon a machine translation of the Fujino reference. A copy of this translation accompanies this office action, and any references to Fujino are to this machine translation unless otherwise specifically noted.

5. Claims 1 and 13 require a method for fabricating a light-metal casting (specifically an aluminum wheel), comprising the steps of: casting a single piece light metal part by applying a casting pressure of more than about 50MPA from an ejection plunger to a molten metal of a light-metal material poured into a die, to form a casting

having pinholes generated in a casting surface, wherein the generation of pinholes is suppressed to meet a predetermined condition; polishing the casting to reduce the roughness of the casting to form a polished surface having a roughness Rmax not more than a predetermined value; painting the casting after polishing to form a first resin coating layer on the polished surface; plating the casting after being painted to form a layer of metal or metal compound through a dry-type plating on a surface of the resin coating; wherein said casting step includes an auxiliary pressure step for applying, by a pressurizing pin, a pressurizing force to said molten metal of said light metal material filled in a die cavity, in addition to an application of said casting pressure during a solidification process of said molten metal under the casting pressure.

6. Prior to entering into the discussion of the rejection, the examiner recognizes that the term "light-metal" is a term of the art, which typically refers to metals of alloys of Be, Mg, or Al, or other similar metals, and thus is not an indefinite term. Further, the term "dry-plating" is recognized in the art to encompass various known plating techniques, such as chemical vapor deposition, sputtering, plasma deposition, and other techniques. Thus, "dry-plating type" is not an indefinite term.

7. Regarding the limitations of claim 1, Fujino teaches a method for molding an aluminum or aluminum alloy wheel, wherein molten metal (Al or Al alloy) is injected under pressure into mold cavity 5 via injection plunger 15. As the molten metal solidifies, pressurizing pins 16 are made to advance into the molten metal, thereby putting additional pressure on the metal (equivalent to applicants claimed additional

pressurizing step via a pressurizing pin) (sections 11-12 and figures 1-2). It is clear from the figures that the casting is a wheel is of the single piece type.

8. Fujino does not teach forming the single piece aluminum alloy wheel via a method in which a pressure of 50 MPA or more is applied to the molten metal, as required by claim 1. Further, Fujino does not teach the polishing, resin coating, and dry-plating steps required by claim 1.

9. With respect to the pressure requirement however, Sakoda et al. (hereafter Sakoda) teaches a method for forming cast aluminum parts, specifically cast aluminum parts for use in vehicle wheels (page 2, lines 5-9). In this casting method, aluminum or an aluminum alloy is cast in a mold at a pressure of >500kgf/cm^2 (50MPA). Sakoda teaches that if casting is performed at pressures less than 500kgf/cm^2, the cast aluminum is likely to crack, shrink, and exhibit reduced mechanical performance (page 4, lines 36-40).

10. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize >50MPA pressure as taught by Sakoda in the method for casting a single piece aluminum alloy wheel taught by Fujino.

11. One would have been motivated to make such a modification due to the teaching in Sakoda et al. that casting aluminum at less than 500KGF/cm^2 produces a product that is likely to crack, shrink, and exhibit reduced mechanical properties.

12. The examiner acknowledges that the invention of Sakoda is directed towards forming a multipart aluminum alloy wheel. However, Sakoda never explicitly states that the method could not be utilized to form a single piece wheel. Further, the benefits of

the high pressure casting method would extend to any cast aluminum part. Thus, in view of the fact that Fujino teaches forming a single piece aluminum alloy wheel via casting and the teaching in Sakoda of the benefits of high-pressure casting, there is motivation to one of ordinary skill in the art to combine the references with a reasonable expectation of success. Thus, the limitations of claim 1 regarding the casting limitations are met.

13. However, Fujino as modified by Sakoda does not teach polishing a casting to reduce surface roughness, painting the polished casting with a resin material, and dry plating the painted casting with a layer of metal or metal compound as required by claim 1.

14. Regarding these deficiencies, Kaumle et al. teaches a method for gloss coating articles of manufacture, in particular vehicle parts such as wheels or rims (column 1, lines 10-15). Kaumle et al. specifically teaches a method for coating an aluminum or aluminum alloy wheel, wherein the method comprises the following steps: 1. Providing the metal wheel. 2. Mechanically polishing the surface of the metal wheel (equivalent to applicants polishing step). 3. Coating the smoothed surface with a process optimized powder (a powdered paint) finish (equivalent to applicants resin coating step). 4. Coating the process optimized powder layer with a glossy metal/metal alloy layer via magnetron sputtering (equivalent to applicants dry plating step) (column 2, lines 35-42). The method results in a lightweight wheel that exhibits a metallic gloss (column 1, lines 10-15).

15. Therefore it would have been obvious to utilize the polishing, painting, and metal coating steps taught by Kaumle et al. to gloss coat the aluminum alloy wheel taught by Fujino as modified by Sakoda.

16. One would have been motivated to make this modification due to the aesthetic benefits that would be gained. This is a particularly strong motivation, as aesthetic qualities such as gloss, luster, and sheen are well established in the art of wheels to be highly desirable.

17. Regarding the limitations of claim 5, wherein the applicant requires the surface of the polished surface to be less than 6.3μ. Kaumle et al. teaches that the roughness of the aluminum surface before application of the base coat (powdered paint layer) impacts the adhesion of the metal layer.(column 5, lines 9-18). Thus, the examiner takes the position that the surface roughness of the alloy wheel is a results effective variable, and it would have been obvious to one with ordinary skill in the art to change the surface roughness to a desired Rmax in order to achieve a desired level of coating adhesion.

18. Regarding the limitations of claim 6, wherein the applicant requires the first resin layer to have a thickness of 10-40μ. Kaumle et al. teaches that the powdered paint layer (equivalent to applicants claimed first resin layer) is preferably 30-300μ thick (column 3, lines 25-30). As 30μ is completely encompassed within applicants claimed range, the limitations of claim 6 are met.

19. Regarding the limitations of claims 7 and 9, wherein the applicant requires a transparent second resin layer to be formed on the metal or metal compound layer at a

thickness between 20-50μm. Kaumle et al. teaches that a 20-30μm protective layer of transparent polyurethane (equivalent to applicants claimed transparent resin) is applied to the metal layer (column 3, lines 40-45). As 20-30μm is completely encompassed by applicants claimed range, the limitations of claims 7 and 9 are met.

20. Regarding the limitations of claim 11, wherein the applicant requires the dry type plating to be a sputtering process. Kaumle teaches applying the metal layer via magnetron sputtering, as stated above for claim 1. Thus, the limitations of claim 11 are met.

21. Regarding claims 15-16, wherein the applicant requires the wheel to be made of aluminum or aluminum alloy. Fujino, Sukoda and Kaumle teach that aluminum or aluminum alloy wheels can be used (as set forth above by Fujino and Sukoda, and as taught by Kaumle, column 5, lines 35-45).

22. Regarding claims 1-4 and 14, wherein the applicant requires that the light-metal casting have small pinholes in its surface, wherein the number of pinholes is less then 10 per 100cm^2, have a maximum open diameter of 2mm, the number of pinholes having a maximum open diameter between 1-2mm is 1 or 0, and the roughness Rmax to be less than 1.6μm. The roughness requirements are met as set forth above for claim 5. Further, with respect to the pinhole requirements, although Fujino as modified by Sakoda and Kaumle does not specifically disclose these requirements, the examiner takes the position that these limitations are met as the combination results in a wheel that is manufactured from an identical light metal (aluminum or aluminum alloy), via the same method (casting), under the same high (>50Mpa) pressure. Thus, the examiner

takes the position that the pinhole limitations required by claims 1-4 and 14 are necessarily met.

23. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujino as modified by Sakoda and Kaumle as applied to claim 1 above, and further in view of Ohtani et al. (US4542070).

24. It is noted that Kaumle teaches applying an adhesion-improving layer between the powdered paint layer and the substrate for the purpose of improving the adhesion of the powdered paint layer (column 3, lines 20-25). This adhesion-improving layer is equivalent to applicants claimed primer layer between the substrate and first resin layer.

25. However, Fujino as modified by Sakoda and Kaumle does not teach forming a primer between the metal layer and the second resin layer, as required by claim 8.

26. However, Ohtani et al. teaches that the adhesion of a polyurethane layer to a metal substrate is improved by applying a primer to the surface of the metal substrate prior to applying the polyurethane (column 1, lines 42-62).

27. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a primer as taught by Ohtani et al. between the polyurethane topcoat and the metal layer in Fujino as modified by Sakoda and Kaumle.

28. One would have been motivated to make such a modification due to the teaching in Ohtani et al. that the adhesion of a polyurethane layer to a metal layer is improved by applying a primer to a metal substrate prior to applying the polyurethane.

29. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujino modified by Sakoda and Kaumle as applied to claim 1 above, and further in view of Nishimura et al. (JP08041410).

30. For the purpose of this examination the examiner has utilized a machine translation of the Nishimura et al. document to provide the basis for this rejection. A copy of this translation and the original Japanese accompanied a prior office action.

31. Fujino as modified by Sakoda and Kaumle does not teach the limitations of claim 10, wherein the applicant requires the polishing step to comprise barrel polishing.

32. However, Nishimura et al. teaches a method for polishing an aluminum wheel via barrel polishing (abstract). This method is typically used to pre-treat the surface of a aluminum alloy wheel prior to the wheel surface being coated with a plating or paint material (section 38). Nishimura et al. teaches that shot peening is conventionally used in the art to polish aluminum wheels, but results in a relatively rough surface that is undesirable and inhibits the adhesion of subsequent plating or paint coatings that are applied to the wheel surface (section 4). Nishimura et al. teaches that if an aluminum wheel is polished via barrel finishing as opposed to shot peening, the surface roughness of the wheel can be reduced beyond that which is achievable via a shot peening method (section 7).

33. Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to utilize the barrel polishing method taught by Nishimura et al. to smooth the surface of the alloy wheel taught by Fujino as modified by Sakoda and Kaumle et al.

34. One would have been motivated to make this modification due to the teaching in Kaumle et al. that decreasing the surface roughness of an aluminum wheel increases the adhesion of subsequent coatings that are applied to the wheel surface, and the teaching in Nishimura et al. that barrel polishing can achieve significantly lower surface roughness than a standard shot peening method, which is the most common wheel polishing method known in the art.

Response to Arguments

35. Applicant's arguments filed 7/30/03 have been fully considered but they are not persuasive. The bulk of the applicants arguments are directed towards the fact that the prior art utilized in the previous rejection does not teach the applicants claimed additional pressurizing step with a pressurizing pin. This argument is rendered moot by the new grounds of rejection, as the newly cited prior art (Fujino) clearly teaches applicants claimed additional pressurizing step.

36. The applicant has argued that one of ordinary skill in the art would have no motivation to combine the teachings of Sukoda, which is directed towards the formation of multipart wheels, with other prior art directed towards the formation of single part wheels. Further, the applicant opines that the pressure steps taught by Sukoda are merely performed to prevent cracking resulting from the use of the particular aluminum alloy in Sukoda. The examiner is not persuaded by these arguments.

37. Regarding the combination of Sukoda with prior art directed towards Single piece aluminum wheels, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed

invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as set forth above at section 12 of this office action, the examiner acknowledges that the invention of Sakoda is directed towards forming a multipart aluminum alloy wheel. However, Sakoda never explicitly states that the method could not be utilized to form a single piece wheel. Further, the benefits of the high pressure casting method would extend to any cast aluminum part. Thus, in view of the fact that Fujino teaches forming a single piece aluminum alloy wheel via casting and the teaching in Sakoda of the benefits of high-pressure casting, there is motivation to one of ordinary skill in the art to combine the references with a reasonable expectation of success. Thus, the limitations of claim 1 regarding the casting limitations are met.

38. Regarding the applicant's arguments that the pressurizing step used by Sukoda is only performed to addresses issues resulting from the use of a particular aluminum alloy, the examiner is not persuaded by this argument. The issue of aluminum shrinkage in cast molded aluminum wheels is clearly recognized in prior art aside from Sukoda. For instance, the applied Fujino reference explicitly states that shrinkage cavities are prevented in conventional aluminum wheels via pressurizing the mold during casting (section 2). Given this information, one of ordinary skill in the art at the time the invention was made would certainly recognize that that the issues encountered in Sukoda are not solely limited to the specific alloy recited in the reference. Thus, one of

ordinary skill in the art would have had motivation and a reasonable expectation of success in applying the teachings of Sukoda (namely the required pressure) to the teachings of Fujino.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 703-305-0179. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on 703-308-2367. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0389.

NJU

nju

Paul Thibodeau
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